

Bay Delta Conservation Plan – Agency Review – EA Toxins Document Review Comment Form

Please use this form to document your comments to the Effects Analysis - Toxins. Please number your comments in the first column, indicate your agency affiliation in the second column, and reference the comment's location in the review document in the Section, Page, and Line (if provided) columns. Return completed comment forms to Joy Khamphanh by COB Friday, October 28, 2011

To be of the greatest value to the document development process, please make your comments as specific as possible (e.g., rather than stating that more current information is available regarding a topic, provide the additional information [or indicate where it may be acquired]; rather than indicating that you disagree with a statement, indicate why you disagree with the statement and recommend alternative text for the statement). Do not enter information in the Resolution column.

Document: EFFECTS ANALYSIS - TOXINS

Name: state agencies **Affiliation:** _____

Date: 11/01/11

No.	Page #	Section #	Line #	Comment	Disposition
1	Through out	N/A	N/A	<p>Strongly recommend use of "pollutant" (or, if needed, "contaminant") instead of "toxin." "Pollutant" can then be further specified as needed—e.g., "chemical pollutant" (such as selenium or Dieldrin), "physical pollutant" (such as high temperature or turbidity), "toxic pollutant," and so forth. Use of "pollution," "pollutant," and similar terms would be more in agreement with the federal Clean Water Act and State Porter-Cologne Water Quality Control Act (California Water Code), the two primary laws that govern regulation and enforcement of water quality in California.</p> <p>The word "toxin" commonly refers to a poison or venom produced by an animal or plant (including bacteria and algae).</p>	

				<p>“Pollutant,” “toxic pollutant,” and “pollution” are defined in 33 USCS Section 1362 (section 502 of the Clean Water Act), definition numbers 6, 13, and 19.</p> <p>“Contamination” and “pollution” are defined in California Water Code, Division 7, Chapter 2, Sections 13050(k) and 13050(l).</p>	
2	Through out	N/A	N/A	One of the primary effects of changes in water operations on toxins will be the amount of water available for dilution (see general comment 6). In order to evaluate these effects, it is essential that an estimate of changes in water quantity be given in this document. Reference to another part of the BDCP document.	
3	Through out	N/A	N/A	There are numerous grammatical errors throughout this appendix. It is recommended to have the writer(s) edit the document for errors, inconsistencies, and define all acronyms that are not previously defined in the Acronyms and Abbreviations section (D-iv) (i.e. ROA, redox, DDT, MGD).	
4	Through out	N/A	N/A	There is an inconsistency in the use of “covered species” and “covered fish species.” For example, page D-8, section D.2, lines 30-35.	
5	General	N/A	N/A	Assuming that this appendix is renamed pollutants, it would be appropriate to include a discussion of existing low dissolved oxygen conditions in Suisun Marsh and related fish kills. Should also include a discussion of relationship between low dissolved oxygen and methylation of mercury in the marsh. Should also include discussion of nutrients as they relate to toxic or harmful algal bloom formation.	
6	General	N/A	N/A	Recommend further discussion of how changes in dilution of pollution are addressed. Should potentially include discussion of water rights and limitations on obligations to dilute pollution. See attached references to SWRCB water right decisions.	
7	General	N/A	N/A	Similar to how the appendix addresses Grasslands	

				selenium TMDL, capture other regulatory actions/processes that are addressing water quality: 303d list for Delta and Suisun Bay and Marsh, TMDL, irrigated lands regulatory program, point source discharges, particularly wastewater discharges into the Delta and Suisun Bay and Marsh.	
8	D-iv	Acronyms & Abbreviations	N/A	<p>Recommend adding “(equivalent to 1 part per billion, or ppb)” to end of definition of “µg/L.”</p> <p>Recommend adding “(equivalent to 1 part per trillion, or ppt)” to end of definition of “ng/L.”</p> <p>Recommend including definitions for total mercury (inorganic + organic) and methylmercury (organic). See comments below concerning discussion of mercury.</p>	
9	D-iv	Acronyms and Abbreviations	5 th acronym	“DBR” does not stand for CA Department of Boating and Waterways. It should be “DBW.” Also change acronym in the document.	
10	D-5	D.1	4-14	The Executive Summary does not follow the same content and format of conventional executive summaries. It is a description of Table D-1, which should be placed in the results section. The Executive Summary should include a description of the purpose and scope of the appendix while providing an overview of the information the appendix presents.	
11	D-5	D.1	N/A	Table D-1 is not very helpful; too difficult to evaluate or interpret. Perhaps should break into two tables, identifying likelihood of occurrence and likelihood of biologically relevant effects.	
12	D-5-6	D.1	4-5 & table D-1 legend	Line 4-5 express that the color coding in the table (D-1) are based on the following criteria... None, Low, Moderate, High,” but when you go to the legend of the table (D-1) the criteria are “Little, Low, Medium, Likely”. Please clarify the difference or correct the criteria if they should be the same criteria.	
13	D-6	Cache	Delta	Should be shaded for likely, looking only at the core	Explain with evidence. Likelihood of

		Slough	smelt-Eggs	<p>station data this may not be apparent, need to take into account the Cache and North Delta stations.</p> <ul style="list-style-type: none"> • IEP Trawl Data showing percentage of pre-spawn and spent females, which can be viewed as an indication of spawning. 2007-2011 Kodiak trawl surveys 1-5. http://www.dfg.ca.gov/delta/data/skt/DisplayMaps.asp • DFG Smelt surveys: example showing DSM less than 10 mm: 2010 survey 6 http://www.dfg.ca.gov/delta/data/sls/CPUE_Map.asp 	occurrence? Eggs and toxins co-occur – but what evidence is there that there is high potential for effect to warrant a “likely” rating
14	D-6	Cache Slough	Longfin smelt-Juv.	<p>Shade to medium, even though this stage is most commonly associated with Suisun, it is present in the C. SI area as well.</p> <ul style="list-style-type: none"> • IEP Trawl data, 2008-2011 20mm surveys 1-6. http://www.dfg.ca.gov/delta/data/20mm/CPUE_Map3.asp • Barker Slough Pumping Plant reports. http://www.dfg.ca.gov/delta/data/longfin-smelt/documents/ITP-Longfin-1a.pdf 	Explain with evidence Shading is low because of low abundance.
15	D-6	N. Delta	Delta smelt-all	<p>For Delta smelt, the North Delta should be shaded to indicate likely.</p> <ul style="list-style-type: none"> • 2007-2011 Kodiak trawl surveys 1-5. http://www.dfg.ca.gov/delta/data/skt/DisplayMaps.asp • Sommer, T., F, Mejia, M. Nobriga, F. Feyrer, and L. Grimaldo. <u>The Spawning Migration of Delta Smelt in the Upper San Francisco Estuary</u> (pdf, 470 kb). San Francisco Estuary and Watershed Science (2011) 9 (2), 16 pages 	Explain with evidence N. Delta shading should remain little/none. Low abundance of delta smelt in N Delta plus little change in toxins (diversions are all below the major sources of contaminants in this area – diversions into Yolo Bypass only occur during high flows when there is still significant dilution capacity).

16	D-6	N. Delta	Longfin smelt-Juv.	<p>Shade to indicate low.</p> <ul style="list-style-type: none"> Barker Slough Pumping Plant reports. http://www.dfg.ca.gov/delta/data/longfin-smelt/documents/ITP-Longfin-1a.pdf 2008-2011 20mm surveys 1-6. http://www.dfg.ca.gov/delta/data/20mm/CPUE/Map3.asp 	Explain with evidence N. Delta shading should be little/none for all life stages. Low abundance of longfin smelt in N Delta plus little change in toxins (diversions are all below the major sources of contaminants in this area – diversions into Yolo Bypass only occur during high flows when there is still significant dilution capacity).
17	D-7	Yolo Bypass	White sturgeon-Adult	<p>Shade to indicate likely. DWR Yolo Bypass Fish Monitoring program has documented presence every year since monitoring began in 2000. Photographic evidence of white sturgeon caught in Yolo Bypass in 1955.</p> <ul style="list-style-type: none"> Harrell, W.C. and T.R. Sommer. 2003. Patterns of Adult Fish Use on California's Yolo Bypass Floodplain. Pages 88-93 in P.M. Faber, editor. California riparian systems: Processes and floodplain management, ecology, and restoration. 2001 Riparian Habitat and Floodplains Conference Proceedings, Riparian Habitat Joint Venture, Sacramento, California. Reece, K., T. Sommer. 2008. Yolo Bypass Study Highlights. IEP Newsletter 21(3):10. 	Explain with evidence Shading should remain little/none. Text explains that sturgeon are low risk to Hg accumulation due to feeding on low trophic level and fast growth rate (growth dilution). Also, data on actual fish tissue analyses do not indicate high risk. With respect to Cu, text describes only change occurring during first flush – the proposed project does not increase the number of first flushes that will occur, it only changes the duration and extent of inundation.
18	D-7	Cache Slough	White sturgeon-Adult	<p>Shade to likely, presence documented through DFG angler reports.</p> <ul style="list-style-type: none"> DFG angler reports. Online fishing guides for the California: http://www.gofishn.com/content/sturgeon-fishing-in-california DRERIP Life History Conceptual Model for 	Explain with evidence Shading should remain little/none. Text explains that sturgeon are low risk to Hg accumulation due to feeding on low trophic level and fast growth rate (growth dilution). Also, data on actual fish tissue analyses do not indicate high risk. With respect to Cu, text describes only change occurring during first flush – the proposed project does not increase the

				White Sturgeon	number of first flushes that will occur, it only changes the duration and extent of inundation.
19	D-7	Cache Slough	splittail	<p>Shade Egg/Embryo and Larvae to medium</p> <ul style="list-style-type: none"> Sommer, T., R. Baxter, and B. Herbold. 1997. Resilience of splittail the Sacramento-San Joaquin Estuary. <u>Transactions of the American Fisheries Society</u> 126:961-976. Feyrer, F., T.R. Sommer, and R. Baxter. 2005. <u>Spatial-temporal distribution and habitat associations of age-0 splittail in the lower San Francisco Estuary Watershed</u>. <u>Copeia</u> 2005:159-168. Feyrer, F, T. Sommer, and W. Harrell. 2006. <u>Managing floodplain inundation for native fish: production dynamics of age-0 splittail in California's Yolo Bypass</u>. <u>Hydrobiologia</u> 573:213-226. 	Explain with evidence Shading should remain none. With respect to Hg, text describes that eggs are only exposed for 3-7 days and no evidence of effect, and juveniles feed on low trophic level therefore low risk of accumulation/exposure. With respect to Cu, text describes only change occurring during first flush – the proposed project does not increase the number of first flushes that will occur, it only changes the duration and extent of inundation.
20	D-8	D.2	1	Since water quality generally and drinking water specifically will not be discussed substantially in the EA, add a short section here acknowledging these issues and telling the reader where to find these. Drinking water constituents of concern include dissolved organic carbon, bromide, and other disinfection byproduct precursors.	
21	D-8	D.2	8	Remove comma after “temperature”	
22	D-8	D.2	11-14	This suggestion should provide more detail on the DRERIP modeling or a citation to the DRERIP toxins analysis.	
23	D-8	D.2	13	What does DRERIP stand for? Please spell out and list on acronyms page.	
24	D-8	D.2	19	Provide a citation for the other appendix.	
25	D-8	D.2	19-21	Outline what approach will be used in cases where “data inputs and...analytical...tools” are not sufficient.	

				Qualitative versus quantitative?	
26	D-8,9	D.3	37-2	Nobriga and Herbold don't define "stressor", nor do they limit it to human activities. Line 37 suggests that we should substitute for "Human activities" the more general term "Processes". I suggest adding "adversely" before most groups of verbs in this paragraph, unless "stressor" is intended to include processes that are beneficial, which I suspect it doesn't.	
27	D-9	D.3	4	Include Glibert et al 2011 in list of references.	
28	D-9	D.3	8	The word "acutely" should be inserted before the word "lethal"	
29	D-9	D.3.1	17-24	Choose either "contaminants" or "toxins", but not both, or explain very clearly which ones you are focusing on. Not all contaminants are toxins. Add to "land use", "other human activities" (e.g., shipping). Add "pesticides" to "Urban development in Table D-2. Discuss urban pesticide, herbicide, pathogens, to integrate following half-page. Mention that these are covered in following sections.	
30	D-9	D.3.1	18	The two large watersheds that form the Delta (Sacramento and San Joaquin watersheds) also import toxins into the Delta	
31	D-9	D.3.1	19-21	This should include agriculture in the upstream tributaries as well, especially as it relates to increases San Joaquin River flows and selenium and sediment transport.	
32	D-9	Table D-2	N/A	The table is not consistent with text in the Appendix. Need to clarify what table is trying to portray. Recommend modifying table to include categories of constituent of concern, transport mechanism and biological relevance. Refer to comments 33-38.	
33	D-9	Table D-2	Mining row	Aside from copper/mercury, isn't the acidic nature of mine waste water at issue?	
34	D-9	Table D-2	Ag. row	It would seem logical to include selenium and sediment in the "Typical Contamination Issues" for Agriculture. Coupled with this could be added "drainage" or "runoff"	

				in the “Typical Discharges to Water” column in reference to selenium.	
35	D-9	Table D-2	Ag. row	Herbicides and pharmaceuticals should be included in the list of “Typical Discharges to Water” for Agriculture. Diuron is getting increased attention due its toxic effects on phytoplankton. Pharmaceuticals from animal ag are mentioned in EDC discussion.	
36	D-9	Table D-2	Rural human habitation row	(ammonia) should be included with nutrients for Rural human habitation.	
37	D-9	Table D-2	Urban dev. Row	Pesticides and pharmaceuticals in personal care products should be included in the list of “Typical Discharges to Water” for Urban development. Reports indicate Pesticides are being discharged by Sacramento WWTP and through storm water outfalls. (Weston)	
38	D-9	Table D-2	Urban dev. row	I’m concerned that only metals, pesticides and PAH’s are included. Although I’m not an ecologist, I believe that other contaminants in stormwater can affect sensitive species. Stormwater can be responsible for additional nutrients from lawn and garden fertilizer (nitrogen and phosphate species) that can affect the ecosystem. Additional nutrients can lead to algal blooms, and low DO thus affecting the oxygen available for sensitive fish species. Zinc has also been known to be an issue in stormwater and can cause suffocation in fish. Background reference: http://www.pwrc.usgs.gov/infobase/eisler/chr_26_zinc.pdf). There are also other metals, minerals and so forth in storm water, but I think the ones I’ve listed are those that may have an impact to sensitive species.	
39	D-10 and through out	D.3.1	3-10	There is no mention of sediment and sediment transport in this section. Although it is mentioned in almost all of the toxins mentioned as an important issue resulting from current practices, proposed restoration on ROA’s, and increased San Joaquin River flows. The document	

				should include a much more thorough discussion on sediment and its association with the toxins discussed.	
40	D-10	D.3.1	8	More than 3 families of pesticides have been used in the Delta. The 3 listed families may be the ones of primary concern.	
41	D-10	D.3.1	22-24	This is your topic sentence. Put it at the top of the paragraph.	
42	D-10	D.3.1	25-33	Area percentage is a weak argument if the urban loading is higher than proportional to land area. If loading is small, say so. Discuss briefly, or point to where it is discussed elsewhere.	
43	D-10	D.3.1	25-33	Urban runoff is also a major source of pyrethroids (Weston and Lydy 2010). And copper runoff from roadways is also a likely major source.	
44	D-10	D.3.1	34-36	Replace wording “compounds will.....research” with “compounds, which include many of the pesticides, are also referred to as <i>emerging contaminants</i> and will be discussed in limited detail.”	
45	D-10	D.3.1	39-42	This paragraph needs to be captured in table D-2.	
46	D-11	D.4	18	Insert “available occurrence data” following “...analytical tools,...	
47	D-11	D.4	30	Need full reference for CH2MHill	
48	D-12	D.4.1	11	Include reference for Glibert 2010 and Glibert et al 2011	
49	D-12	D.4.2	21	Figure D-1 contains a set of disconnected boxes, no linkages or magnitudes. So it is very difficult to understand how, for example, operations or restoration interact with species and stressors. “Current conditions-Fate and Transport” are not compared to “Future conditions”. This “grouping as either water operations or restoration” is far from clear in Figure D-1. The various boxes are floating completely disconnected from each other, though extending the shading of the tan, green, and blue boxes from left to right would be an improvement. Including verbs in the boxes to the right, taken from the text, would help. A list of nouns is not an	

				"effect"	
50	D-12,13	D.4.2.1.1	All	"Fate and Transport" appear in each sub-section, but we are missing a discussion of how the overall hydrology of the Delta will change with "dual conveyance", etc., and this hydrology, even if only sketched out, is critical to estimating residence times and fate & transport. This is mentioned elsewhere, D-14 line 7, but not here.	
51	D-13	D.4.2.1.2	28-32	<p>Recommend this revised language: "<i>Bioaccumulation</i> is often (loosely and/or incorrectly) used interchangeably with the term <i>biomagnification</i>. Strictly speaking, bioaccumulation occurs at any one trophic level or in any one species (and age-class) as a pollutant is ingested inside of food items or absorbed from the environment and thereby <i>accumulates</i> to some concentration within tissues of organisms at that particular trophic level or in that particular species (and age-class). In contrast, biomagnification more properly refers to increases in tissue concentrations of a pollutant as it passes upward through the food chain, from prey to predator, to the topmost, mature predators. In these top predators tissue concentrations may be harmful both to the animal (especially to offspring) and to those that consume it. A common example of a pollutant bioaccumulating and biomagnifying to harmful levels is the buildup of mercury in large game fish such as tuna or striped bass. In summary, bioaccumulation happens within a specific trophic level; biomagnification occurs over multiple trophic levels. For purposes of simplicity in this analysis, however, the term <i>bioaccumulation</i> will encompass biomagnification through the food chain."</p> <p>Note: It would probably be better (more accurate; reduce potential confusion) to correctly distinguish between "bioaccumulation" and "biomagnification" throughout the document. For example, page D-16, line 8.</p>	
52	D-13	D.4.2.1.2	37	Insert "some" before "pesticides."	

53	D-14	D.4.2.2	4	The sentence, which describes the way that conservation measures are grouped, should also include “other stressors” since CM 13 is discussed in this Appendix	
54	D-14	D.4.2.2	12	Last word in the paragraph “river” should be replaced with “Delta”. Reduction in flows of S.R.....decreased dilution of toxins in the Delta. See comment #6.	
55	D-14	D.4.2.2	12	Change wording from “...Delta intakes also could result...” to “Delta intakes may also result...”	
56	D-14	D.4.2.2	13-17	This paragraph is the guidepost on which the entire appendix should hang. Move this paragraph to the top, and the rest makes much more sense. It sets the scope, and makes it clearer that the appendix doesn’t substantially discuss changes in Operations.	
57	D-14, D-15, et seq.	Mercury	general	<p>Discussions of environmental mercury sampling and assessment should always start with:</p> <ul style="list-style-type: none"> - Careful differentiation between total mercury and methylmercury samples, when each is used, and how they relate (if at all). - Elaboration between collection/sample media (i.e., [air], water, sediment/soil, and tissue). - Clarification of criteria/guidelines (e.g., TMDLs, USEPA CTR criteria) and orders of magnitude to be expected for samples of and from the above—e.g., ppm for methylmercury in sport fish versus ppt for methylmercury in water. <p>Many discussions of environmental mercury are confusing because authors jump without clarification from total to methylmercury and from samples in one medium to another. Besides careful writing, the consistent use of parts per million/billion/trillion, while not always strictly accurate, may help reduce reader confusion.</p> <p>Recommend focusing on methyl-mercury to the extent</p>	

				possible. This is because levels of total mercury, in sediment and in water for example, may not always relate strongly and consistently to levels of methylmercury in fish and other organisms. The methylmercury that finds its way into the food chain, and eventually into top predators and game animals, is the most important factor, not necessarily how much (mostly inorganic) total mercury is present.	
58	D-14 to D-18	D.5.1	General	Other factors (besides quantity/concentration) that effect methylation (i.e. anoxic conditions, pH, temperature) should also be discussed. Specifically for Project actions, such as restoration and construction, the effects of excavation should be discussed. If this discussion is elsewhere in the BDCP, a citation/reference could be made to this information.	
59	D-15	Table D-3	CTR column	Does CTR stand for Criterion Total Recoverable? Please explain in footnote or list in Acronyms and Abbreviations page.	
60	D-15	D.5.1.1	1-32	Adding the observed concentrations of both metallic and methylmercury to Table D-3 would greatly ease comparisons between regulation levels and observed levels.	
61	D-15	D.5.1.1	8-22	This discussion of the amount of methylmercury in the Delta should be rewritten for clarity. Further, concentrations should be used instead of percentages for consistency.	
62	D-15	D.5.1.1	10	Change wording from "the Yolo Bypass and Cache Creek" to "Cache Creek and Yolo Bypass, where Cache Creek terminates." To better represent geographical loading processes.	
63	D-15	D.5.1.1	16	Consider mentioning that Resolution R5-2010-0043 was adopted 4/22/2010 (Basin Plan Amendment) by the California Regional Water Quality Control Board, which calls for reductions in methylmercury from the Yolo Bypass.	
64	D-15	D.5.1.1	17-22	This section should mention the statewide mercury	

				TMDL effort with the expectation that it will be the upcoming regulatory driver for areas without more local TMDL restrictions.	
65	D-16	D.5.1.1	8	“bioaccumulates” should be “biomagnifies.”	
66	D-16	D.5.1.1	32	Spell out ROA, and all acronyms, when first used. Please list on the acronyms page.	
67	General	D.5.1.2	N/A	Definitely recommend contacting Darell Slotton at UCD (dgslopton@ucdavis.edu) for copies and inclusion of more of his work sampling methylmercury levels using resident small fish in and around the Sac-SJ River Delta. In recent years Slotton has worked with Cal-Fed, DFG (Mark Stepheson), and with SFEI in the SF Bay.	
68	D-17	D.5.1.2.1	18	Change to “Cache Creek area and Yolo Bypass”	
69	D-17	D.5.1.2.1	20	“Operation of north Delta intakes” should be replaced by “Preliminary Proposal Actions” since increased flows to the Yolo Bypass is a separate conservation measure and not necessarily dependent upon operation of the north Delta intakes. This needs to be corrected in other places in the document as well.	
70	D-17	D.5.1.2.1	25-27	Haven’t these questions been extensively studied by, among others, Darrell Slotton of UC Davis. You list him with Alpers et al (2008), but there is much more information available than USGS “fact sheets”.	
71	D-17	D.5.1.2.1	25-28	We have most of the information listed and should be able to bracket a range of effects of water operations on mercury availability	
72	D-17	D.5.1.2.2	31	Suggest the deletion of (CM 4) in this sentence since CM 4 does not include creating floodplain habitat.	
73	D-17	D.5.1.2.2	36	Need a reference for the statement indicating photodegradation of methylmercury in shallow waters.	
74	D-17	D.5.1.2.1, D.5.1.2.2	-	General comment tied to Cache Slough and the Yolo Bypass: How will BDCP changes in restoration and water operations affect the fate and transport of mercury to the North Bay Aqueduct intake at Barker Slough?	
75	D-18	D.5.1.2.2	5-6	Isn’t there continuous methylation of mercury from sediment supply after the first flush?	

76	D-18	D.5.1.2.2	7-12	Provide citation for the mentioned management measures being developed for mercury. What effort is this referring to? Is this related to the DFG/ERP effort in the Yolo Wildlife Area or USGS study in Cosumnes?	
77	D-18	D.5.1.2.3	14-19	Need to include a more detailed description of the modeling – how it was done.	
78	D-19	D.5.2.1	3	It would be helpful to the reader to indicate here and throughout whether the text is referring to the Delta specifically (as in legal Delta) vs. the Delta watershed, as I think is the case when discussing sources of contaminants.	
79	D-18	D.5.2.1	35	Coast Ranges: plural or singular?	
80	D-19	Table D-4	N/A	The footnotes are not assigned to anything on the table. Insert footnote letters to table categories.	
81	D-19	D.5.2.1	16	Typographic confusion: The footnote letters (a – f) format is lost, making interpretation of the entries unclear. Since the table only has one entry, might it be clearer to simply explain what 5/12 means, or at least include, e.g. “4 day avg/ max conc.” to make clear that 5/12 does not mean “5 to 12”, commonly written as “5 – 12”.	
82	D-20	D.5.2.1	3-5	The selenium concentrations in 2006-2007 exceeded 5 ug/L; how high were they?	
83	D-20	D.5.2.1	13	It seems that some information that should precede this sentence is missing. "Thus", implies such.	
84	D-20	D.5.2.1	18	The “up to 50,000 clams/sq. meter” statement should have an associated reference.	
85	D-20	D.5.2.1	42-44	Per previous comments on “bioaccumulate” and “biomagnify.” The uses of “accumulate” and “magnify” appear to be correct here (but inconsistent with language elsewhere).	
86	D-21	D.5.2.2	8-12	Delete paragraph; information is stated on next page.	
87	D-21	D.5.2.2.1	14-17	This sentence may confuse readers. Please reword for clarity.	
88	D-21	D.5.2.2.1	21-22	This sentence describes concentrations from the Grasslands Project area and Mud Slough. These	

				concentrations should be converted to loads and compared to loads from other sources like SacR and refineries. Even a annual average volume times the concentrations listed would provide some basis for comparison.	
89	D-21	D.5.2.2.1	29-32	To state that a decrease in Grassland selenium discharge will temper the effects of increased San Joaquin River flow and decreased Sac Flow should be referenced by modeling or data. The discussion needs to capture the uncertainties with the modeling and with attaining the Grasslands Se targets. This also contradicts the statement in D.5.2.2, lines 10-12 that says that Selenium is a concern and that it should be considered in the modeling and analysis.	
90	D-21-22	D.5.2.2.2	40-42/1	To state that the length of time to flush out majority of selenium is unknown is contradictory to the statements in D.6.1 that restoration activities will be short-term.	
91	D-22	D.5.2.2.3	11-17	Need to include a more detailed description of the modeling – how it was done.	
92	D-22	D.5.2.2.3	14	Mercury? Isn't this paragraph about selenium?	
93	D-22	D.5.3.1	N/A	Need to include some description of copper in brakes pads as a source of copper from urban runoff.	
94	D-22	D.5.3.1	N/A	Need to include discussion of low level copper impact on fish olfactory functions. I don't believe these levels are captured in AWQC and they are exceeded in the Delta	
95	D-22	D.5.3.1	21-24	How about domestic wastewater discharge? Is it low compared to these other sources, due to tightening EPA regs?	
96	D-23	D.5.3.1	6	Change to "Arcade Creek, (Domagalski 1998) which receives inputs from a large urban area.	
97	D-23	D.5.3.1	18-20	Will collecting total copper concentrations rather than dissolved copper concentrations affect the data or the conclusions made from the data? What assumptions are being made about these measures?	
98	D-23	D.5.3.1	23	Citation needed.	
99	D-23	D.5.3.2.1	28	What is meant by "elevated but low concentrations"?	

100	D-23	D.5.3.2.1	28	Sentence is vague, needs supporting information. "at levels elevated above (background, other estuaries, some benchmark) but still considered low by (water quality, USEPA, etc.) standards."	
101	D-23	D.5.3.2.1	28	Does "elevated, but low concentrations" mean "widely spatially distributed, but at low concentrations"?	
102	D-23	D.5.3.2.1	30-31	Highest concentrations were for Total copper in the Yolo Bypass, not dissolved, so to say that the concentrations were the highest is not supported. Total and dissolved are not the same nor are they interchangeable.	
103	D-23	D.5.3.2.1	30-35	The sentences describing Yolo Bypass inundation impacts on copper should be moved to next section on restoration. Water operations should have little to no effect on copper because copper is dispersed throughout.	
104	D-23	D.5.3.2.1	34	Change "conservation measure" to Conservation Measure 2 (CM2)	
105	D-23	D.5.3.2.1	38	Replace "restoration in the Yolo Bypass" with CM2 actions.	
106	D-24	D.5.4.1	11-12	The numbers "3" and "4" in the chemical formulas of ammonia and ammonium, respectively, should be subscripts, not superscripts.	
107	D-24	D.5.4.1	13	In second sentence specify that it is environmental unionized ammonia that is toxic to fish. Physiologically it is a different story. See Randall and Tsui, 2002. Ammonia Toxicity in Fish. Marine Pollution Bulletin 45; 17-23.	
108	D-24	D.5.4.1	29	"highest average" vs. "average"? This sounds like a biased comparison but perhaps this has a meaning with which I am unfamiliar.	
109	D-24	D.5.4.1	36-37	Replace "presence/absence of the Unionid mussel...which is very sensitive to ammonia toxicity" with "presence/absence of early life stages of fish." The mussel presence/absence criteria is in the draft criteria described on the next page.	
110	D-25	D.5.4.1	2	Insert the presence/absence of Unionid mussel	

				<i>Anadonata spp.</i> , which is very sensitive to ammonia toxicity to the description of the draft criteria. If the future criteria are adopted, the criteria would be significantly lower; however, none of the 344 samples collected by Foe et al 2010 exceeded the lower levels, though the margin of safety is reduced. The lower levels are exceeded immediately downstream of the discharge and beyond the mixing zone, but not well downstream of the plant.	
111	D-25	D.5.4.1	10-11	Delete last sentence of paragraph regarding revenue sources; irrelevant.	
112	D-25	D.5.4.1	12	The table includes Stockton WWTP data...seems like "Stockton" should be somewhere in the title of the table	
113	D-25	D.5.4.2	N/A	Why is there no discussion on Ammonia modeling?	
114	D-25	D.5.4.2	22	Typo -- author's name is "Wilkerson" Add references to Glibert 2010, Glibert et al 2011 and Teh et al 2011).	
115	D-25	D.5.4.2.1	21-28	The isolated facility diversion points are downstream of the treatment plant; therefore they will not affect dilution. If diversion into the Yolo Bypass affects dilution, it should be described in section d.5.4.2.2 on restoration. However, Yolo Bypass diversions will occur when river flows are high; therefore there should be no relevant effect on dilution capacities. This paragraph should be modified to describe this.	
116	D-25	D.5.4.2.1	24-28	Please provide a broader explanation of the relationship between reductions in WWTP ammonia/ammonium discharge and Sacramento River flows. The description here is so vague that it is confusing.	
117	D-25	D.5.4.2.2	30	This is a broad blanket statement. Won't anoxic conditions in sediments of wetlands and mudflats increase ammonium concentration? Won't biological activity in oxic conditions in those settings tend to remove ammonium? If anything I would expect the restoration to REDUCE ammonia/um.	
118	D-26	D.5.5	N/A	Pyrethroids vary in toxicity, and acute effects can be observed to sensitive aquatic organisms at concentrations as low as 2 ng/L for cypermethrin ¹ . In	

				<p>addition, these materials may have additive effects, and it is useful to use a toxic units approach when evaluating their toxicity.</p> <p>¹Weston, D. P.; Jackson, C. J. 2009. Use of engineered enzymes to identify organophosphate and pyrethroid-related toxicity in toxicity identification evaluations. <i>Environ. Sci. Technol.</i> 43, 5514–5520.</p>	
119	D-26	D.5.5.1	N/A	This section should include a discussion on increased floodplain flows on lands that are farmed, as should other sections with similar toxin characteristics. While initial flooding may result in short-term effects, the continued activity of occasional flooding over multiple years could then have a collaborative long-term effect.	
120	D-26	D.5.5.1	3-42	Urban areas, both urban runoff and WWTP discharges are significant sources of pyrethroid pesticides to the Delta watershed. Weston and colleagues have published a number of studies on this (I can provide references later if needed). This information needs to be included in this section.	
121	D-26	D.5.5.1	8	Pyrethroids can cause acute toxicity to aquatic invertebrates at concentrations as low as 2 nanograms per liter (Weston and Lydy 2010).	
122	D-26	D.5.5.1	12	Insert after Werner and Orem 2008 a sentence describing that pyrethroid use has also shifted to more toxic forms of pyrethroids (Amweg et al 2005)	
123	D-26	D.5.5.1	22-25	The percentages do not add up.	
124	D-26	D.5.5.1	25-27	Suggested change: "70 sediment samples were collected from agricultural drainage dominated irrigation canals, which run through 10 Central Valley counties. Analysis showed pyrethroids in 75% of the samples (Weston et al. 2004)."	
125	D-26	D.5.5.1	29	Add "urban storm water inputs". Weston found toxic levels both on the American River and the Sacramento River from Storm water collection stations and drains. It is not just coming from the WWTP.	

126	D-26	D.5.5.1	29	Add to end of sentence “and in urban stormwater runoff.”	
127	D-26	D.5.5.1	35-40	Surrounding paragraphs provide quantitative values with which the reader can reason and evaluate. But this paragraph provides little quantitative information. What factors promote breakdown, which inhibit? Provide some half-lives (even if very wide ranging) for the effects of temperature and pH. How alkaline is “alkaline” on line 38?	
128	D-26	D.5.5.1	36-37	Definition of half-life should be in line 24.	
129	D-26 to D-29	N/A	N/A	The pesticides sections need to be updated to include recent and planned efforts of the Central Valley Regional Water Quality Control Board to develop pesticide TMDL programs.	
130	D-27	D.5.5.2.1	8-10	It is not clear how water operations would not involve flooding of pyrethroid-containing soils, when section D.5.5.2.2, lines 13-14, specifically states that flooding of ROAs will make pyrethroids available to the aquatic food chain. Recommend discussion of other covered activities as described in Chapter 4. For example, maintenance activities like dredging.	
131	D-27	D.5.5.2.2	17-18	The last part of the sentence “and more of an effect on the biota” is unclear to me. Are they saying that restoration measures won’t really increase the pyrethroid concentrations but WILL have a non-pyrethroid related effect on biota? Maybe the part after the comma should just be removed.	
132	D-27	D.5.5.2.2	21	Replace “counter” with “minimize.”	
133	D-27	D.5.6.1	N/A	This section should include a discussion of upstream tributaries contributions to organochlorines with respect to sediment transport, especially from the San Joaquin River.	
134	D-27	D.5.6.1	32-36	Spell out or list in Acronyms and Abbreviations page: CVRWQCB, DDE, DDE, and DDT.	
135	D-27	D.5.6.1	34	Remove “they persist in the environment and...”	
136	D-28	D.5.6.1	3	The sentence states that EPA has flagged 2 of these 3 criteria. What were they flagged for; review?	

137	D-28	D.5.6	10,12,16,26,28	"Organophosphates" is used in place of "Organochlorines" in several places on this page.	
138	D-28	D.5.6.1	6-16	This entire paragraph refers to the properties of organochlorine pesticides, however the text refers to the pesticide as organophosphates.....a very different family of pesticides with different properties.	
139	D-28	D.5.6.2.1	28	The word "load" should be removed from the sentence. Even though concentrations are low and may stay the same with increased San Joaquin River flows, a change in loading will occur. This statement should also be supported (referenced) by modeling and/or data.	
140	D-29	D.5.7.1	7	What is meant by "fairly equally"?	
141	D-29	D.5.7.1	7-8	Suggested change: "...fairly equally, while the majority..."	
142	D-29	D.5.7.1	12	Replace "and has" to "due to".	
143	D-29	D.5.7.1	28	"proposed maximum...." Proposed by whom? Please provide.	
144	D-29	D.5.7.1	33	May want to include "DFG Hazard Assessment Criteria for Chlorpyrifos is 0.014 µg/L and for Diazinon it is 0.05 µg/L."	
145	D-29	D.5.7.1	34	The units used in this line are in µg/L where in the previous paragraph, everything is in ng/L. It should be consistent.	
146	D-30	D.5.7.2.1	6	While no change in mobilization or distribution may occur, reduction in Sacramento River flow due to North Delta intake would result in an increase in concentrations within the Delta.	
147	D-30	D.5.7.2.2	8-13	Add discussion of organophosphate concentrations decreasing over time due to decreases in applications as lands are converted from ag to restoration areas.	
148	D-30	D.5.8.1	18	The reference "Riordan and Adam 2008" should read "Riordan and Biales 2008." Biales is the last name.	
149	D-30	D.5.8.1	20	"to pelagic the POD" should read "to the POD."	
150	D-30	D.5.8.1	38	"EDC compounds" is typed, but EDC has previously been explained on line 16 (same page) to mean Endocrine-disrupting compounds so you don't need the	

				word “compounds” again, it should be deleted.	
151	D-31	D.5.8.3	25 & others	The Dept. of Boating and Waterways is no longer using Komeen per 10/28/11 phone conversation with Terri Ely, Supervisor, DBW Aquatic Weed Unit. Section D.5.8.3 and Table D-6 could be updated to reflect that change.	
152	D-31	D.5.8.3	29	I know it gives the units for the chemical concentrations in the preceding paragraph, but the table should have it also.	
153	D-32	D.5.8.3	10-11	What is the reasoning for this mitigation measure?	
154	D-32	D.5.9	N/A	Add discussion of urban source of pyrethroids in stormwater runoff as documented by Weston and Lydy 2010.	
155	D-32	D.5.9	19	The % of urban land development does not necessarily reflect the % of loading contributed by urban land development to the Delta. Area is a weak argument if loading is unknown. This assertion needs to be backed up with references. It may be true that currently the Delta includes only 9% urban development, but the urban population in the Sacramento Valley is projected to grow from 2.9 M in 2010 to 3.4 M in 2020 (17 percent increase) and to 5.1M in 2050 (73% increase). In the SJ Valley, population is projected to grow from 4.2M in 2010 to 5.3M in 2020 (26% increase) and to 9.4 M in 2050 (124%). (Draft SWP Sanitary Survey Report to CDPH). Therefore, the statement that urban contaminants are generally a minor component of the toxins present in the Delta system may not be correct. Without new regulations or mitigation, population growth impacts to stormwater discharges could become a more important component to the toxics picture. This is important even today. For example, MWQI found that the Steelhead drainage system that drains much of the N. Sacramento urban area could provide up to 90% of the daily organic carbon load to the the Sacramento River during a storm event http://www.water.ca.gov/waterquality/drinkingwater/docs/	

				Steelhead%20Creek%20rpt%20FINAL.pdf.	
156	D-32	D.5.9.1	39	..."PCBs are not recognized as a critical contaminant." This should be cited.	
157	D-32	D.5.9.1	43	"de Vlaming" not de Vleming	
158	D-33	D.5.9.1	2,4,7,8, 11	"de Vlaming" not de Vleming	
159	D-33	D.5.9.1	N/A	Add discussion of Ostrach et al 2008 and Ostrach et al 2009 study results.	
160	D-33	D.6	16-19	This paragraph and table d-7 should go after section d.6.2.4. Putting them before the discussion leaves the reader wondering how the results were determined and what they mean. Also, the table need to more clearly identify the difference between high potential for effect and high potential for biologically relevant effect.	
161	D-34 to D-37	Table D-7	all	Table does not match heading. Content of table unclear. What is it saying about toxins? Describing fish occurrence?	
162	D-34-37	Table D-7	Yolo Bypass and Cache Slough	For all places where M,C is present under Yolo Bypass and Cache Slough should also include "P". <ul style="list-style-type: none"> http://www.waterrights.ca.gov/baydelta/docs/exhibits/DOI-EXH-48I.pdf http://www.yolobasin.org/management/PDF%20by%20Chapter/3.4%20Geomorphology%20Hydrology%20and%20Water%20Quality.pdf 	
163	D-36	Table D-7	Cache Slough	Should be shaded to indicate "low" and include "M,C,P" <ul style="list-style-type: none"> http://www.water.ca.gov/iep/newsletters/1996/summer/96sum14.cfm 2010, 2011 20mm surveys 5 and 6. http://www.dfg.ca.gov/delta/data/20mm/CPUE_Map3.asp 	

164	D34-37	Tale D-7	N Delta	If table is describing effects of increased toxins and not just co-occurrence of life stage with toxin, then N delta shading should all be none since the diversions to new conveyance facilities are all below the major sources of pollutants – no change to dilution and diversions to Yolo Bypass are only occurring under high flow conditions.	See general comment #161 about table
165	D-37	Table D-7	Legend	The 'low' and 'medium' colors are difficult to tell apart	
166	D-38	D.6.1	2-19	The Bay Delta system is not mercury limited, and the discussion that the system will be "flushed out" implies that the availability of mercury will change. A reviewer suggests being more conservative in this discussion.	
167	D-38	D.6.1	4	To stay consistent with the document, his sentence should read..."change how <i>some</i> toxins move through..."	
168	D-38	D.6.1	6-9	Are the restoration action effects on selenium and mercury really only short-term. I was under the impression that there are stores of each of these contaminants in the sediments that would continue to become available over time.	
169	D-38	D.6.1	8-9	This section should include a discussion on increased floodplain flows on lands that are farmed, as should other sections with similar toxin characteristics. While initial flooding may result in short-term effects, the continued activity of occasional flooding over multiple years could then have a collaborative long-term effect.	
170	D-38	D.6.1	15-16	This statement needs supporting evidence/citation and is not consistent with text throughout the Appendix.	
171	D-38	D.6.2	31-32	Suggest changing "minimal" to "limited"... "covered" species	
172	D-38	D.6.2	34	Suggested change from "...it is assumed..." to "it is believed that..."	
173	D-38 D-39	D.6.2.1	37-38 1-2	Of course, benefits from restoration should, over time, far outweigh any short-term costs from the temporary exposure to initial levels of flushed methylmercury. Please check with Darell Slotton at UCD for more insight	

				on the likelihood of m-Hg impacts for habitat restoration. Additional objective clarifying language making this point should be included	
174	D-39	D.6.2.1	8	“Spawn in the Cache Slough area, directly downstream of the Yolo Bypass or other.....”. Not aware of any evidence that DSM spawn in the Bypass. May want to word as “directly downstream of the Yolo Bypass”	
175	D-39	D.6.2.1	18-19	States that “the 3.2% increase observed should be considered in the context of life stage.” How so? This concept needs to be explained further.	
176	D-41	D.6.2.3	7	Scarce but not nonexistent: Copper Toxicity for Delta Species was done by Werner, see POD September 30 2005 progress report by Werner. Much information exists for CHN and Copper effects.	
177	D-41	D.6.2.3	7	There are sources of data for effects of copper on trout and salmonid eggs. These data were developed by the DFG pollution lab. Citation from American Fisheries Society 111:645-650, 1982 <u>Toxicities of Copper, Zinc, and Cadmium Mixtures to Juvenile Chinook Salmon</u> , B.J. Finlayson and K. M. Verrue	
178	D- 41	D.6.2.3	10-11	Citations are needed for studies that suggest that Iron Mountain Mines discharge was the source of copper accumulation in the Yolo Bypass.	
179	D-41	D.6.2.3	11	After “discharge” insert “via the Sacramento River”. As is wording implies that Iron Mtn. Mine drains directly into the Bypass.	
180	D-41	D.6.2.3	24-25	The statement “and initial inundation is expected to flush copper from the restored area” seems to skate over the fact that during initial inundation, Cu will be in the system at elevated levels. The next sentence says the exposure of fish to Cu won’t change substantially. Even if it won’t be for very long, isn’t it possible that fish of all life stages will be affected more during the initial inundation than any other time? Or is this truly insignificant? This discussion also needs to take into account the number of years that inundation will occur	

				under the proposed project compared to existing conditions. While the proposed project may increase the frequency and extent of inundation, it has little effect on the number of years, and therefore the number of first flush events that will occur.	
181	D-42	D.7.1	29	The word Contamination has a typo error.	
182	D-44, D-49	D.7.1	36-37, 10	Some references need formatting. For example: page D-44, lines 36 and 37 should be indented and aligned with the other references.	
183	D-45	D.7.1	1	“de Vlaming” not “de Vleming”	
184	D-47	D.7.1	26	The authorship should read “Riordan, D. and A. Biales.” Biales is the last name.	
185	N/A	Figure D-2	N/A	Need space between “to” and “Methylmercury”	
186	N/A	Figure D-2	N/A	Mark Stephenson and the Moss Landing Marine Lab have a much more comprehensive diagram of the environmental mercury cycle (see screenshot , below). Recommend that you ask Mark (mstephenson@mlml.calstate.edu) for permission to use it in place of Figure D-2.	
187	N/A	Figure D-2	N/A	This figure should include other higher order predators, such as birds and humans, that have had documented effects from methylmercury.	

ATTACHMENT TO TOXICS COMMENTS

If the water quality analysis ultimately concludes there is a biologically relevant change in a pollutant level related to a proposed change in the amount of water the SWP and CVP convey through the Delta, there is a legal question regarding whether the SWP and CVP should continue to mitigate the effect caused by another's pollution through continued dilution of the pollution with SWP and CVP water.

As SWRCB Decision 1379 explains, it is the state's policy that pollution be remediated at the source, stating:

Recent state and regional board activity in the regulation of waste discharges demonstrates an intent to protect the Delta environment with stringent controls on waste discharges at the earliest reasonable date. Waste discharges will be managed and where possible reused with a view toward achieving these prime objectives. No one has a right to pollute the waters of the state regardless of the quantity of water that may flow in the particular streams.

In fact, it is likely a waste of water, thus prohibited under state law, to use water resources to dilute pollution. SWRCB Decision 1628 states:

The use of water to dilute pollutants other than ocean derived salts may be unreasonable. The Board prefers to control pollution at its source. The Board's regulations provide that the quantity of water diverted under a permit or license is subject to modify if necessary to meet water quality objectives, but the regulations also provide that the Board will not modify a permit or license if water quality objective can be achieved through the control of waste discharges. 23 Cal. Code Regs. Section 780(b).

Based on the statements above, as well as other legal and scientific rationales, before mitigation measures could be imposed requiring the maintenance of flows for dilution of pollution, the factors found in state law relating to the waste of water must be applied. There are quite a few factors that would have to be evaluated, like the fact there readily identifiable polluters that are already under legal obligations to cease the continued pollution of the state's waters, the state law that requires that water be put to its highest and best use, the Delta Legislation that commits the state to the dual goals of water supply and environmental protection, the infeasibility of using available water supplies to dilute pollution as a result of the flashy nature of many toxic events (like first flush events), etc.

